Remarks

Claims 1-22 are pending. Claims 1, 14, and 19 are independent claims.

The independent claim 1 has been amended to delete the language "to as close as possible to zero", for overcoming the claim objection based on indefiniteness of the final Office action dated January 25, 2006.

With respect to the previous rejections under 35 U.S.C. §§ 102 and 103 based upon the primary reference **Welch (5,568,026)**, it is respectfully suggested that the Examiner carefully reconsider the specific teachings of such primary reference **Welch (5,568,026)**.

In particular, please refer initially to the flow chart of **Fig. 7d** of **Welch** which shows "**signal processing sequences for implementing the synchronization steps**" (col. 3. lines 25-27) of the wiper system. Specifically, step S24 "**identifies which blade is the leading blade; that is which blade has entered the new region first**" (col. 6, lines 60-61). Then step S26 "**sets a timer for a duration of T1, which is the sampling window that determines if the synchronization action needs to be taken**". These two steps are seen at the bottom of **Fig. 7d**. Step S26 then leads to step S30 as seen at the top of the signal processing sequence of **Fig. 7e**.

Step S30 is a test which continuously asks, during the timer duration sampling window, if the lagging blade has entered into its region. See column 6, line 64 to column 7, line 2. Then step 32, as seen in **Fig. 7e**, "**deter-**

mines if it (the lagging blade) has entered the next region within the time T1" (column 7, lines 3-4). As seen in **Fig. 7e**, step S32 essentially asks if T1 is exceeded, i.e. if the lagging blade has not entered into its respective region within the sample time T1, set in a timer as above in step S26. If the lagging blade has not entered into its respective region within the sample time T1, the leading blade motor is stopped and the leading blade is allowed to coast at step S34 (column 7, lines 4-8). If instead the lagging blade has entered into its region within the sample time T1, no "coasting" of the leading blade takes place and the process is returned to a "**subsequent processor cycle interval**" (column 7, lines 8-11).

Note that a "**coast timer is started in step S36**" when the lagging blade lags in excess of T1 and the leading blades motor is stopped to create coasting of the leading blade, and step S38 "**determines if the coast time is exceeded**", which if in the affirmative asks at step S40 in essence if the lagging motor has finally caught up, and if not "**dynamic braking is initiated**" of the lead motor at step S42 (see column 7, lines 12-19). Power is restored to the leading blade, either after only coasting has taken place, or after both coasting and dynamic braking has taken place, once the lagging blade has finally caught up (column 7, lines 19-22).

These operative sequences may also be clearly understood from the independent claim 1 of **Welch**: "**signal processing means for providing the first and second motor drive signals; for receiving the first and second position signals; for providing a coast signal if the first blade has reached a first location before the second blade has reached a second**

position; for interrupting the first motor drive signal in response to the coast signal; for providing a dynamic braking signal if the second blade has not reached the first position after a selected elapsed time following the coast signal"; and from the independent claim 11 of **Welch**: "**signal processing means for receiving said position signals while the first and second blades are moving and synchronizing the motion of the blades by interrupting power to a motor powering the first blade if the second blade is not at the same position as the first blade; dynamically braking said motor if the second blade is not at the same position as the first blade after the power is removed from said motor; and restoring power to said motor when the second blade is at the same position as the first blade**".

For further comprehension of the synchronization operation of **Welch**, please also see the timing chart of **Fig. 4** of **Welch** showing "**wiper synchronization using just the "coast" sequence**" (column 3, lines 16-17), and **Fig. 3** of **Welch** showing "**wiper synchronization using "coast" and "dynamic braking" sequences**" (column 3, lines 13-14). The **coast sequence** of **Fig. 4** shows **power off** of the leading blade (coasting) after time expiry of set time **T1**, and subsequent **power on** of the leading blade after the lagging blade has entered its appropriate region **n**. Lagging blade power is always **on**. The **coast and dynamic braking** sequence of **Fig. 3** shows **power off** of the leading blade (coasting) after time expiry of set time **T1**, and subsequently at time **t2** when lagging blade is still in its lagging region **n-1** a power **on** of dynamic braking, until finally when the lagging blade has reached its appropriate region **n** there occurs a simultaneous power **off** of

the dynamic brake and a power **on** of the leading blade. Also here, lagging blade power is always **on.**

In summary therefore, it would appear clear that **Welch** teaches a synchronization system for wiping blades in which after a leading blade passes a first position, a control is carried out to check for the passage of a lagging blade at a second position within a set time period. If the lagging blade reaches its second position before the expiration of the set time period, nothing is changed and both the leading and lagging blades are continuously powered. If instead the lagging blade does not reach its second position within the period of set time, the power to the leading blade is cutoff so that the leading blade is allowed to coast, and during a set coasting period of time, a control is still carried out to check for the passage of the lagging blade at its second position within the set coasting time period. If the lagging blade reaches its second position within the period of set coasting time, the leading blade is re-powered. If instead the lagging blade does not reach its second position within the set coasting time period, a dynamic braking of the leading blade is carried out. When the lagging blade finally reaches its second position, the dynamic braking of the leading blade is turned off and simultaneously the leading blade is re-powered.

Applicant submits that this synchronization system of Welch is far removed from the synchronization device and method as claimed in the claims 1-20 presented herewith.

Specifically, applicant's claimed synchronization device of the inde-

pendent claim 1 requjires "***means for measuring, at each wipe, and in relation to the transit of said at least two wipers at the respective means for signaling transit and direction of transit, the lead time error of each one of the at least one wiper that is faster with respect to the slower wiper of said at least two wipers***". To the contrary, **Welch** **does not disclose any** means for measuring a lead time error of a faster wiper with respect to a slower wiper. As it has been shown above, **Welch** only controls a faster wiper by coasting such faster wiper and/or braking such faster wiper if a slower wiper does not arrive within a first and/or second preset time period.

In addition, applicant's claimed synchronization device of the independent claim 1 requires "***means for calculating, at each wipe, a correction time in order to reduce said lead time error of each one of said at least one faster wiper such that each correction time is a function of said corresponding lead time error***". **Welch** **does not disclose any** means for calculating a correction time that is a function of a lead time error between a faster wiper and a slower wiper. As mentioned above, **Welch** does not even calculate any lead time error of a faster wiper with respect to a slower wiper, hence it logically follows that **Welch** also does not disclose any means for calculating a correction time that is a function of a lead time error between a faster wiper and a slower wiper.

Moreover, applicant's claimed synchronization device of the independent claim 1 requires "***means for applying, at each wipe, each one of said correction times to said corresponding motor/gearmotor of each one of said at least one faster wiper which interrupt/reduce power of the corre-***

sponding motor/gearmotor and reduce the corresponding lead time error". **Welch** does not disclose any means for applying a correction time, that is a function of a lead time error of a faster wiper with respect to a slower wiper, to the faster wiper. While it may be true that Welch interrupts power to a faster wiper, as discussed above the power interruption is based only on whether or not the slower wiper arrives at a set position within a time period. There is no calculation in **Welch** of any lead time error of a faster wiper with respect to a slower wiper, and there is no calculation in **Welch** of a correction time that is a function of a lead time error, and there is no application in **Welch** of a correction time that is a function of a lead time error to the faster wiper that reduce the corresponding lead time error.

Applicant submits that it appears clear that **Welch** does not disclose the above-cited specific limitations of the pending independent claim 1. Accordingly, it is submitted that **Welch** does not anticipate applicant's invention as defined in such independent claim 1. "A claim is anticipated only if each and every element as set forth in the claim is found...in a single prior art reference." ***Constant v. Advanced Micro-Devices, Inc.***, 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir. 1988).

Applicant further submits that the prior art of record does not render the subject matter of the pending independent claim 1 obvious to a person having ordinary skill in the art. As discussed above, **Welch** teaches a wiper synchronization system in which after a faster wiper has passed a first position, there occurs a checking of the eventual passage of a slower wiper at a second position, with an eventual "coasting" and/or "dynamic breaking" of

the faster wiper according to the late arrival of the second wiper at its second position. There is never any discussion, hint, or suggestion in **Welch** of providing means for measuring a lead time error of the faster wiper with respect to the slower wiper, means for calculating a correction time that is a function of the measured lead time error, and means for applying the calculated correction time to the faster wiper. The other prior art references of record also do not provide any teaching, hint, or suggestion that would lead a person having ordinary skill in the art to modify the system of **Welch** in order to arrive at applicant's claimed invention.

Braun *et al* (6,218,741) discloses automatic windshield wiper operation based upon detection of rain on the windshield.

Kühbauch (5,157,314) discloses a windshield wiping system including a single drive unit connected to a pair of wipers by a pendulum transmission, sensors for sensing the position of each of the wipers, a control device connected with the drive unit and sensors, and an actuating element which includes another electric motor and which is arranged in a connecting rod of the pendulum transmission and which is connected to the control device to change an effective length of the connecting rod in a working connection with the control device.

Ishikawa *et al* (4,742,280) discloses a car wiper control device including a control electronic circuit driving the wiper in forward or reverse direction and configured to minimize connection brushes adaptable for small spaces.

Note further that applicant's claimed invention advantageously provides a particularly effective synchronization of the wiper blades due to an efficient dynamic and precise synchronization at each pass of the wiper blades, which is also extremely adaptable to a variety of user requirements, due to *inter alia* the combined claimed dynamic elements of the measurement of the lead time error of the faster wiper with respect to the slower wiper, of the calculation of the correction time that is a function of the lead time error, and of the application of the correction time that is a function of the lead time error to the faster wiper that reduces the lead time error. It is submitted that these advantageous results are completely surprising and unexpected over the prior art of record.

In view of the foregoing therefore, applicant submits that the subject matter of the independent claim 1 submitted herewith, and of the claims 2-13 dependent therefrom, is patentable over the prior art of record.

Note further that the independent claim 14 also includes the combined features as discussed above of the means for measuring a lead time error of the faster wiper with respect to the slower wiper, means for calculating a correction time that is a function of the measured lead time error, and means for applying the calculated correction time to the faster wiper. Accordingly it is submitted that such independent claim 14 is also patentable over the prior art of record.

The features of the newly added claims 15 and 17 are disclosed

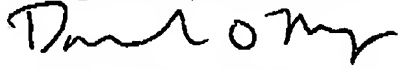
originally at page 8, line 29 to page 9, line 3 of applicant's disclosure. It is believed that such claims 15 and 17, dependent upon the independent claims 1 and 14 respectively as discussed above, are also in an allowable state.

The features of the newly added claims 16 and 18 are disclosed originally at page 8, line 3 of applicant's disclosure. It is believed that such claims 16 and 18, dependent upon the independent claims 1 and 14 respectively as discussed above, are also in an allowable state.

The new claims 19-22 define the method aspect of applicant's invention as easily deducible by a person skilled in the art from the original disclosure. Such claimed method includes *inter alia* the combined method steps of "***measuring, at each wipe, and in relation to the transit of said at least two wipers, a lead time error of each one of said at least two wipers that is faster with respect to a slower wiper of said at least two wipers; calculating, at each wipe, a correction time in order to reduce said lead time error of each one of said at least two wipers that is faster with respect to a slower wiper of said at least two wipers such that each correction time is a function of said corresponding lead time error; and applying, at each wipe, each one of said correction times to a respective said motor/gearmotor to reduce said lead time error***". In view of the above discussions relating to the patentability of the apparatus claim 1 over the prior art of record, applicant submits that the new method claims 19-22 are also patentable over the prior art of record.

In view of the foregoing, applicant respectfully solicits allowance of pending claims 1-22.

Respectfully submitted,



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